

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-9. (Cancelled)

10. (Currently Amended) A similar-pattern searching apparatus for searching a pattern having a high similarity to a target pattern of a test sample from a group of patterns including a plurality of patterns, the similar-pattern searching apparatus comprising:

a storage unit that stores therein a class map generated by selecting ~~a model parameter~~ model parameters that characterize a plurality of component fractions included in each pattern in the group and by clustering the patterns based on selected model ~~parameter parameters, the model parameters including a number, an average, a variance and a density~~ parameters, the model parameters including a number, an average, a variance and a density for the plurality of component fractions; and

a similar-pattern searching unit that selects a class similar to a component fraction included in the target pattern from the class map in the storage unit, wherein the similar-pattern searching unit that detects the class based on similarity distance from a target class, which is equal to or smaller than a predetermined threshold, and that determines the pattern included in the class as a pattern having a high similarity to the target pattern.

11. (Previously Presented) The similar-pattern searching apparatus according to claim 10, wherein the patterns are any one of one-dimensional and multi-dimensional.

12. (Previously Presented) The similar-pattern searching apparatus according to claim 11, wherein the patterns are any one of leukocyte particle size patterns, protein electrophoretic waveforms, and blood cell histograms.

13. (Currently Amended) A similar-pattern searching method, employed in a medical support system, of searching a target pattern having a high similarity to a pattern of a test sample from a group of patterns including a plurality of patterns, the similar-pattern searching method comprising:

generating a class map by selecting ~~a model parameter~~ model parameters that characterize a plurality of component fractions included in each pattern in the group and by clustering the patterns based on selected model ~~parameter~~ parameters, the model parameters including a number, an average, a variance and a density for the plurality of component fractions;

storing the class map generated at the generating step into a storage unit; and

selecting a class similar to a component fraction included in the target pattern from the class map in the storage unit, wherein the selecting includes detecting the class based on similarity distance from a target class, which is equal to or smaller than a predetermined threshold, and determining the pattern included in the class as a pattern having a high similarity to the target pattern.

14. (Currently Amended) A computer-readable recording medium ~~that stores therein~~ encoded with a computer program that causes a computer to search a target pattern having a high similarity to a pattern of a test sample from a group of patterns including a plurality of patterns, the computer program causing the computer to execute:

generating a class map by selecting ~~a model parameter~~ model parameters that characterize a plurality of component fractions included in each pattern in the group and by clustering the patterns based on selected model ~~parameter~~ parameters, the model parameters including a number, an average, a variance and a density for the plurality of component fractions;

storing the class map generated at the generating into a storage unit; and

selecting a class similar to a component fraction included in the target pattern from the class map in the storage unit, wherein the selecting includes detecting the class based on similarity distance from a target class, which is equal to or smaller than a predetermined threshold, and determining the pattern included in the class as a pattern having a high similarity to the target pattern.

15. (Previously Presented) A similar-pattern searching apparatus for searching a leukocyte particle size pattern having a high similarity to a target leukocyte particle size pattern of a test sample from a group of patterns including a plurality of leukocyte particle

size patterns, each of the leukocyte particle size patterns including a plurality of cellular component fractions, the similar-pattern searching apparatus comprising:

- a primary clustering unit that clusters the leukocyte particle size patterns, which are obtained by measurement, in the group while applying a self-organizing map to the leukocyte particle size patterns to thereby generate a primary class map;

- a first-parameter determining unit that executes an EM algorithm for each leukocyte particle size pattern included in the primary class map by using predetermined initial values to thereby determine first-mixture-distribution model parameters including number of cellular components contained in each leukocyte particle size pattern and an average, a variance, and a density of each cellular component;

- a second-parameter determining unit that executes an EM algorithm for each leukocyte particle size pattern in the group by using the first-mixture-distribution model parameters as initial values to thereby determine second mixture distribution model parameters including number of the cellular components contained in each leukocyte particle size pattern, and an average, a variance, and a density of each cellular component;

- a secondary clustering unit that clusters the leukocyte particle size patterns in the group while applying the self-organizing map to the first mixture distribution model parameters to thereby generate a secondary class map;

- an inter-class distance master generator that calculates similarity distances between all combinations of the classes included in the secondary class map, and that generates an inter-class distance master that includes a correspondence of each combination of the classes and the similarity distance for the combination;

- a storage unit that stores therein the secondary class map and the inter-class distance master;

- a class determining unit that determines a target class belonging to each of cellular component fractions included in the target leukocyte particle size pattern from the secondary class map in the storage unit; and

- a similar-pattern searching unit that detects, as a similar class, a class from the inter-class distance master for which similarity distance from the target class is equal to or smaller than a predetermined threshold, and that determines a leukocyte particle size pattern

included in the similar class as a pattern having a high similarity to the target leukocyte particle size pattern.

16. (Currently Amended) A similar-pattern searching method, employed in a medical support system, of searching a leukocyte particle size pattern having a high similarity to a target leukocyte particle size pattern of a test sample from a group of patterns including a plurality of leukocyte particle size patterns, each of the leukocyte particle size patterns including a plurality of cellular component fractions, the similar-pattern searching method comprising:

- clustering the leukocyte particle size patterns, which are obtained by measurement, in the group while applying a self-organizing map to the leukocyte particle size patterns to thereby generate a primary class map;

- executing an EM algorithm for each leukocyte particle size pattern included in the primary class map by using predetermined initial values to thereby determine first-mixture-distribution model parameters including number of cellular components contained in each leukocyte particle size pattern and an average, a variance, and a density of each cellular component;

- executing an EM algorithm for each leukocyte particle size pattern in the group by using the first-mixture-distribution model parameters as initial values to thereby determine second mixture distribution model parameters including number of the cellular components contained in each leukocyte particle size pattern, and an average, a variance, and a density of each cellular component;

- clustering the leukocyte particle size patterns in the group while applying the self-organizing map to the first mixture distribution model parameters to thereby generate a secondary class map;

- calculating similarity distances between all combinations of the classes included in the secondary class map, and generating an inter-class distance master that includes a correspondence of each combination of the classes and the similarity distance for the combination;

- storing the secondary class map and the inter-class distance master in a storage unit;

determining a target class belonging to each of cellular component fractions included in the target leukocyte particle size pattern from the secondary class map in the storage unit; and

detecting, as a similar class, a class from the inter-class distance master for which similarity distance from the target class is equal to or smaller than a predetermined threshold, and determining a leukocyte particle size pattern included in the similar class as a pattern having a high similarity to the target leukocyte particle size pattern.

17. (Currently Amended) A computer-readable recording medium ~~that stores therein~~ encoded with a computer program that causes a computer to search a leukocyte particle size pattern having a high similarity to a target leukocyte particle size pattern of a test sample from a group of patterns including a plurality of leukocyte particle size patterns, each of the leukocyte particle size patterns including a plurality of cellular component fractions, the computer program causing the computer to execute:

clustering the leukocyte particle size patterns, which are obtained by measurement, in the group while applying a self-organizing map to the leukocyte particle size patterns to thereby generate a primary class map;

executing an EM algorithm for each leukocyte particle size pattern included in the primary class map by using predetermined initial values to thereby determine first-mixture-distribution model parameters including number of cellular components contained in each leukocyte particle size pattern and an average, a variance, and a density of each cellular component;

executing an EM algorithm for each leukocyte particle size pattern in the group by using the first-mixture-distribution model parameters as initial values to thereby determine second mixture distribution model parameters including number of the cellular components contained in each leukocyte particle size pattern, and an average, a variance, and a density of each cellular component;

clustering the leukocyte particle size patterns in the group while applying the self-organizing map to the first mixture distribution model parameters to thereby generate a secondary class map;

calculating similarity distances between all combinations of the classes included in the secondary class map, and generating an inter-class distance master that includes a correspondence of each combination of the classes and the similarity distance for the combination;

storing the secondary class map and the inter-class distance master in a storage unit;

determining a target class belonging to each of cellular component fractions included in the target leukocyte particle size pattern from the secondary class map in the storage unit; and

detecting, as a similar class, a class from the inter-class distance master for which similarity distance from the target class is equal to or smaller than a predetermined threshold, and determining a leukocyte particle size pattern included in the similar class as a pattern having a high similarity to the target leukocyte particle size pattern.

18. (Currently Amended) A fraction separating apparatus for separating a plurality of cellular component fractions included in a leukocyte particle size pattern, the fraction separating apparatus comprising:

a primary clustering unit that clusters a plurality of leukocyte particle size patterns, which are obtained by measurement, while applying a self-organizing map to the leukocyte particle size pattern ~~patterns~~ to thereby generate a primary class map;

a parameter determining unit that executes an EM algorithm for each leukocyte particle size patterns included in the primary class map by using predetermined initial values to thereby determine mixture distribution model parameters including number of cellular components contained in each leukocyte particle size pattern, and an average, a variance, and a density of each cellular component fraction ~~fractions~~; and

a fraction separating unit that executes an EM algorithm for each leukocyte particle size pattern by using the mixture distribution model parameters as initial values to thereby separate the cellular component fractions included in each leukocyte particle size pattern.